

Homework.

Textbook pg 17

1a-d, 2, 3, 4 a-b, 5 a-b, 6-8, 11 and 14

Sept 15th Homework

Write each product as a number in standard form:

$$\text{a) } 2^2 \times 3^2 = 2 \times 2 \times 3 \times 3 = 4 \times 9 = 36$$

$$\text{b) } 7^2 \times 2^3 = 7 \times 7 \times 2 \times 2 \times 2 = 392$$

$$\text{c) } 5^2 \times 3^3 = 5 \times 5 \times 3 \times 3 \times 3 = 675$$

or this way:

$$\text{d) } 2^2 \times 3^2 \times 5 = 4 \times 9 \times 5 = 180$$

List the prime factors of each number (when listing and not putting as a product, you do not need to list the same number more than once):

a) 21 b) 14 c) 100 d) 125

e) 19 f) 50 g) 77 h) 96

a) 3, 7

d) 5

f) 2, 5

h) 2, 3

b) 2, 7

e) 19

g) 7, 11

c) 2, 5

Write each number as a product of prime factors. Use exponents where possible.

- a) 48 b) 63 c) 400 d) 16
e) 120 f) 55 g) 36 h) 88

a) 48

$$\begin{array}{c}
 48 \\
 \swarrow \searrow \\
 2 \times 24 \\
 \swarrow \searrow \quad \swarrow \searrow \\
 2 \times 2 \times 12 \quad 2 \times 6 \\
 \swarrow \searrow \quad \swarrow \searrow \quad \swarrow \searrow \\
 2 \times 2 \times 2 \times 3 \quad 2 \times 3 \\
 2 \times 2 \times 2 \times 2 \times 3 \\
 48 = 2^4 \times 3
 \end{array}$$

b) 63

$$\begin{array}{c}
 63 \\
 \swarrow \searrow \\
 3 \times 21 \\
 \swarrow \searrow \quad \swarrow \searrow \\
 3 \times 3 \times 7 \\
 63 = 3^2 \times 7
 \end{array}$$

c) 400

$$\begin{array}{c}
 400 \\
 \swarrow \searrow \\
 2 \times 200 \\
 \swarrow \searrow \quad \swarrow \searrow \\
 2 \times 2 \times 100 \quad 2 \times 50 \\
 \swarrow \searrow \quad \swarrow \searrow \quad \swarrow \searrow \\
 2 \times 2 \times 2 \times 25 \quad 2 \times 2 \times 5 \\
 2 \times 2 \times 2 \times 2 \times 5 \times 5 \\
 400 = 2^4 \times 5^2
 \end{array}$$

Other answers

$$d) 2^4$$

$$e) 2^3 \times 3 \times 5$$

$$f) 5 \times 11$$

$$g) 2^2 \times 3^2$$

$$h) 2^3 \times 11$$

Use the prime factors from questions 2 and 3.

Find all the common factors of each pair of numbers

a) 55, 88

$$\begin{array}{c} 55 \\ / \quad \backslash \\ 5 \times 11 \end{array}$$

$$\begin{array}{c} 88 \\ / \quad \backslash \\ 2 \times 44 \\ / \quad \backslash \\ 2 \times 22 \\ / \quad \backslash \\ 2 \times 2 \times 11 \end{array}$$

b) 48, 120

$$\begin{array}{c} 48 \\ / \quad \backslash \\ 2 \times 24 \\ / \quad \backslash \\ 2 \times 12 \\ / \quad \backslash \\ 2 \times 6 \\ / \quad \backslash \\ 2 \times 2 \times 2 \times 3 \end{array}$$

$$\begin{array}{c} 120 \\ / \quad \backslash \\ 2 \times 60 \\ / \quad \backslash \\ 2 \times 30 \\ / \quad \backslash \\ 2 \times 15 \\ / \quad \backslash \\ 2 \times 2 \times 3 \times 5 \end{array}$$

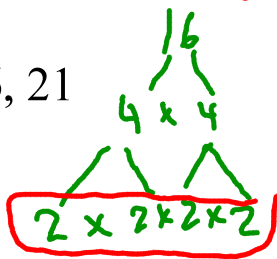
C.F. = 2, 3, ① 4, ② 6, ③ 8, ④ 12, ⑤ 24

- ① $2 \times 2 = 4$ } doubles
- ② $2 \times 3 = 6$ }
- ③ $2 \times 2 \times 2 = 8$ } triples
- ④ $2 \times 2 \times 3 = 12$ }
- ⑤ $2 \times 2 \times 2 \times 3 = 24$

Use the prime factors from questions 2 and 3.

Find the first 3 common multiples of each pair of numbers

a) 16, 21



$$L.C.M = 2 \times 2 \times 2 \times 2 \times 3 \times 7$$

$$= 336$$

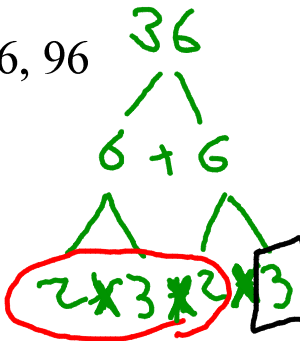
$$2^{nd} L.C.M = 336 \times 2$$

$$= 672$$

$$3^{rd} L.C.M = 336 \times 3$$

$$= 1008$$

b) 36, 96



$$L.C.M = 2 \times 2 \times 3 \times 3 \times 2 \times 2 \times 2$$

$$= 288$$

$$2^{nd} L.C.M = 288 \times 2$$

$$= 576$$

$$3^{rd} L.C.M = 288 \times 3$$

$$= 864$$

A number has 2,3, and 5 as factors.

- a) Which number is the least possible number with these factors?
- b) Find two more numbers with these factors.

$$2 \times 3 \times 5 = 30$$

$$\begin{aligned} b) \quad 30 \times 2 &= 60 \\ 30 \times 3 &= 90 \end{aligned}$$

Ⓟ According to a student, the least number that has 2,3,4, and 5 as factors can be found by multiplying $2 \times 3 \times 4 \times 5$.
Is this student correct? Explain.

$$\begin{array}{c} 2 \times 3 \times \cancel{4} \times 5 \\ \quad \wedge \\ \quad 2 \times 2 \end{array}$$



Answer: No. When all of the factors are PRIME, then multiplying them together gives you the lowest number. In this case, the 4 is not prime. This will mess us up, because if we were to make 4 prime, it would be 2×2 . We would have factors of 2, 3, 2×2 , and 5. You can see that we no longer need the FIRST 2, because the factor of 2 is included in the 2×2 . Therefore, multiplying $2 \times 3 \times 4 \times 5$ will give is a number that is double the lowest number with 2,3,4, and 5 as factors. $2 \times 3 \times 4 \times 5 = 120$. $2 \times 2 \times 3 \times 5 = 60$. Both have 2,3,4, and 5 as factors.

Can you find the greatest number with 11, 23, and 37 as factors? Explain

No — $11 \times 23 \times 37$ will give us a number, but we could always multiply by more.

A number has 21 and 77 as factors.

Which is the least possible number?

$$7 \times 3 \times 11 = 231$$

$$21 \begin{array}{c} \swarrow \searrow \\ 3 \times 7 \end{array}$$

$$77 \begin{array}{c} \swarrow \searrow \\ 7 \times 11 \end{array}$$

Which other numbers are factors of your number in a) Explain your reasoning.

~~73~~ $F = 1, 3, 7, 11, 21, 77, 33, 231$

① 3×7 ③ 3×11
② 7×11

$$7 \times 3 \times 11 = \underline{\hspace{2cm}}$$

Is $4^2 \times 4^2$ a prime factorization of 256? Explain.

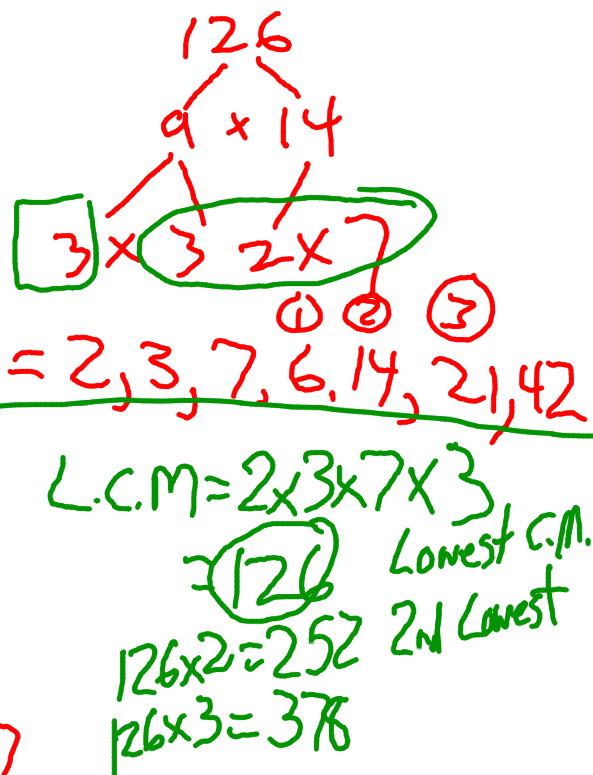
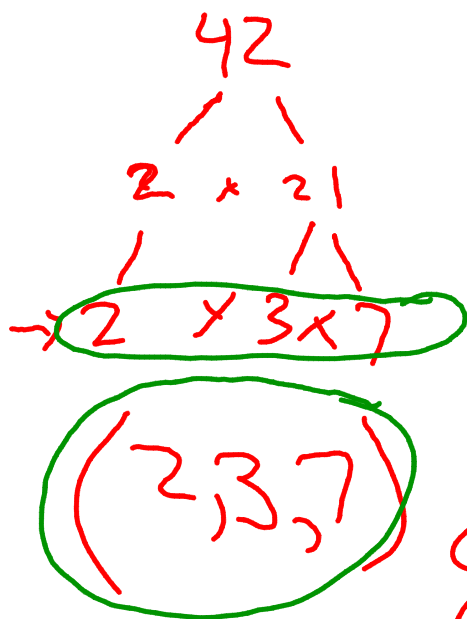
$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 256$
 $4 \times 4 \times 4 \times 4 = 256$
 2^8 is prime factorization of 256

* List all common factors using prime factors.

a) 42, 126

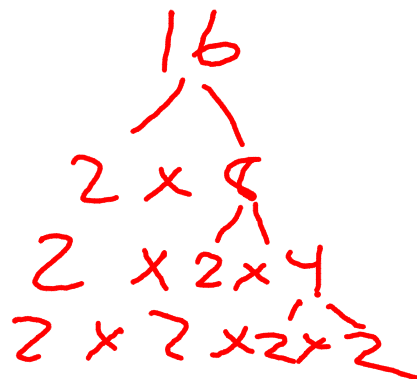
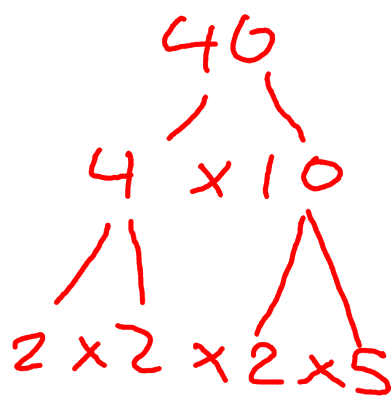
b) 40, 16

c) 49, 343



C.F = $2, 3, 7, 6, 14, 21, 42$

- ① 2×3
- ② 2×7
- ③ 3×7
- ④ $2 \times 3 \times 7$



$(2, 2, 2)$ C.F. = 2, 4, 8

- ① 2×2
- ② $2 \times 2 + 2$

$$\begin{array}{c} 49 \\ / \quad \backslash \\ 7 \times 7 \end{array}$$

$$C.F. = 7, 49$$

$$(7 \times 7)$$

$$\begin{array}{c} 343 \\ / \quad \backslash \\ 49 \times 7 \\ / \quad \backslash \\ 7 \times 7 \times 7 \end{array}$$

